

HENRY B. SELKIRK, Ph.D.

7216 Minter Place • Takoma Park, MD • (301) 434-0174 • hselkirk@mindspring.com
Code 614, NASA Goddard Space Flight Center • Greenbelt, MD • (301) 614-6846 • Henry.B.Selkirk@nasa.gov

SCIENTIST • MANAGER • DIRECTOR

Dr. Selkirk has over 30 years of experience as a researcher in the atmospheric sciences, the last 14 in project leadership, and over 7 years of experience as a manager in GESTAR, including time as Acting Director.

Dr. Selkirk has direct research experience in the GESTAR Work Scope areas of Atmospheric Chemistry and Dynamics and Global Modeling and Assimilation and has supervised GESTAR scientists in Climate and Radiation, Hydrological Sciences, Ocean Ecology, Biospheric Sciences, and Mesoscale Atmospheric Processes.

Project and Personnel Management experience and skills:

- Principal Investigator on numerous grants, awards and contract for over 25 years
- Management of projects with procurements and subcontracts
- Project financial management
- Deep familiarity with Cooperative Agreement administrative procedures at NASA GSFC
- Employee representative on USRA 401k Investment Committee
- As Acting Director, oversaw successful completion of USRA job realignment at GESTAR and ensured completion of GESTAR contributions to USRA Annual Metrics and Annual Reports
- Employee performance review and mentoring
- Advice and support to GESTAR management in hiring decisions and NASA sponsor relations
- Successful advocate for multiple employee promotions

Dr. Selkirk believes...

That the talent, creativity and hard work of GESTAR scientists since 2011 have played a major role in making the NASA Goddard Space Flight Center the world's pre-eminent center for Earth Science

That the most important role of Director of GESTAR is to foster an atmosphere where that talent, creativity and hard work are encouraged and properly rewarded

PROFESSIONAL EXPERIENCE

UNIVERSITIES SPACE RESEARCH ASSOCIATION / NASA Goddard Space Flight Center, Greenbelt, MD

Associate Director (October 2018 – Present)

Responsibilities: *Direct supervision of GESTAR scientist group including timekeeping performance evaluation, hiring, interaction with management staff, proposal opportunity identification and support*

Active scientific research, including leadership of PI grant

Assistance to GESTAR Director as requested

Employee representative on USRA 401k Investment Committee

Direct supervision of 20 GESTAR scientists with assistance and advice to program management as needed

Investigator in two active scientific research projects:

- Principal Investigator for Ticosonde observations of water vapor, ozone and sulfur dioxide
- Validating TROPOMI SO₂ as member of the ESA Sentinel 5 Precursor Validation Team
- Working with SAGE III team to arrange coincidence launches for ozone and water vapor validation
- Investigating ice microphysics in the NASA GEOS-5 Atmospheric General Circulation Model
- Overseeing subawards to the Science & Technology Corporation and New Technology Costa Rica

Manager II & Manager III (July 2015 – March 2017 – September 2018)

Responsibilities: *Direct supervision of GESTAR scientist group including timekeeping performance evaluation, hiring, interaction with management staff, proposal opportunity identification and support*

Active program of scientific research, including leadership of 2 PI grants

Employee representative on USRA 401k Investment Committee

Served as GESTAR Acting Director Aug – Sep 2018

- Managed successful completion of the GESTAR job realignment with assent from NASA sponsors
- Led on-time completion of GESTAR contributions to USRA Annual Metrics and Annual Reports
- Represented GESTAR at Quarterly and Monthly Directors' meetings and Program Monthly review

Successfully resolved a variety of NASA bureaucratic and personnel-related issues for group members

- Organized team to provide full-time escorting for GESTAR scientist from designated country
- Teamed with GESTAR Director Bill Corso to resolve several difficult personnel issues

Principal Investigator award, ROSES 2016 Upper Atmosphere Composition Observations (UACO)

- Continues Ticosonde balloon sounding in Costa Rica through 2020
- Successful leadership through first and second years of award
- New efforts initiated in Costa Rica to support SAGE-III validation and to improve radiosonde measurement of relative humidity in tropical upper troposphere
- Managed subawards with 4 separate organizations, including two universities and one foreign entity

Principal Investigator on additional award and GESTAR investigator on third

Staff Scientist J & Scientist III (May 2011 – February 2012 – June 2015)

Responsibilities: *Active program of scientific research, including leadership of 2 PI grants*

Direct supervision of GESTAR scientist group including hiring, interaction with management staff, proposal opportunity identification and support

GESTAR Group Lead since August 2011 with direct supervision of GESTAR scientists

Principal Investigator grant award, 2012 NASA Upper Atmosphere Composition Observations (UACO)

- Supported Ticosonde balloon sounding in Costa Rica through 2016
- Added volcanic SO₂ emissions to TICOSONDE measurement suite with successful demonstration of dual ozone sonde profiling technique in early 2012
- This led to funding of regular SO₂ balloon sounding by OMI Science Team

Principal Investigator for SEAC4RS

- Led team that successfully launched 19 balloon sondes during SEAC4RS field campaign, Aug–Sep 2013 and delivered the data to the mission archive

UNIVERSITY OF MARYLAND BALTIMORE COUNTY / NASA Goddard Space Flight Center, Greenbelt, MD

Research Scientist (December 2008 – May 2011)

Responsibilities: *Scientific research, including management of two PI awards*

Principal Investigator grant award, 2008 NASA Atmospheric Composition: Surface, Balloon and Airborne

- Supported Ticosonde balloon sounding in Costa Rica through 2012
- Management of the observational program involved procurements and subawards in addition to overall scientific direction.

Principal Investigator, “Modeling and observational studies of moisture in the upper troposphere and lower stratosphere and the climatic effects of aviation”.

- Contract awarded 2010 by the Dept. of Transportation for the FAA Atmospheric Climate Change Research Initiative (ACCRI).
- Led team of two Co-Investigators and NASA collaborators investigating impacts of aviation emissions on atmospheric chemistry.

Co-Investigator, “Comparisons of Observations from 3D models: A Path to Improved Prediction”, awarded under the NASA Atmospheric Chemistry Modeling and Prediction program.

BAY AREA ENVIRONMENTAL RESEARCH INSTITUTE / NASA Ames Research Center, Moffett Field, CA

Senior Research Scientist (March 2002 – October 2008)

Responsibilities: *Scientific research, including management of succession of PI awards*

Principal Investigator, Ticosonde radiosonde campaigns in Costa Rica, 2004-2007.

- Over 900 sondes flown 4x-daily in five field campaigns, three in support of NASA’s airborne campaigns Tropical Convective Systems Processes (TCSP), Costa Rica AVE (CR-AVE) and Tropical Composition, Clouds and Climate Coupling (TC4)
- Organized launch teams of students from the Universidad de Costa Rica (UCR) and the Universidad Nacional Autonoma (UNA) in collaboration with the Instituto Meteorológico Nacional (IMN).
- These projects involved extensive collaborative work with Costa Rican scientists and institutions.

Chief Meteorologist, Cirrus Regional Study of Tropical Anvils and Cirrus Layers – Florida Area Cirrus Experiment (CRYSTAL-FACE), Jul–Aug 2002. Responsible for flight briefings to the aircrews for seven research aircraft, including the NASA ER-2 and WB-57F.

SAN JOSE STATE UNIVERSITY / Department of Meteorology, San Jose, California

Lecturer (January – May 2008): Taught undergraduate course on Climate Change

SPACE PHYSICS RESEARCH INSTITUTE / NASA Ames Research Center, Moffett Field, California

Research Scientist (February 1991 – March 2002)

Provided flight planning support and data analysis for multiple NASA and NSF research aircraft missions, including SOLVE (11/1999–3/2000), ACCENT (4/1999 and 9/1999), SONEX (Oct 1997), POLARIS (May 1997), VOTE/TOTE and STRAT (1995-1997), ASHOE-MAESA (May 1994), and CEPEX (3/1993).

During ACCENT campaign worked with air traffic control scientists at NASA Ames to better understand the data flow from high altitude aircraft into the DoT’s Enhanced Traffic Management System (ETMS).

NATIONAL RESEARCH COUNCIL / NASA Ames Research Center, Moffett Field, California

Post-doctoral Associate (February 1988–February 1991)

Edwin F. Danielsen and Leonhard Pfister, Advisers

MASSACHUSETTS INSTITUTE OF TECHNOLOGY / Cambridge, Massachusetts

Post-doctoral Associate and Research Staff (March 1986 – February 1988)

Recent GRANTS and CONTRACTS

Principal Investigator, 2017-present: “TICOSONDE: Tropical balloon sonde observations of ozone, water vapor and sulfur dioxide for continued support of satellite calibration and validation capabilities”. Supported by the NASA Upper Atmosphere Composition Observations (UACO) and Aura satellite science programs.

Principal Investigator, 2013-2016: “TICOSONDE: Tropical balloon sonde observations of ozone, water vapor and sulfur dioxide for continued support of satellite calibration and validation capabilities”. Supported by the NASA Upper Atmosphere Composition Observations (UACO) and Aura satellite science programs.

Principal Investigator, 2012-2016: “Balloon sonde profiling of water vapor and ozone for SEAC⁴RS”.

Principal Investigator, 2009-2012: “TICOSONDE: Tropical balloon sonde observations of ozone, water vapor and sulfur dioxide for continued support of satellite calibration and validation capabilities”. Supported by the NASA Upper Atmosphere Composition Observations (UACO) and Aura satellite science programs.

Principal Investigator, 2010–2014: “Modeling and observational studies of moisture in the upper troposphere and lower stratosphere and the climatic effects of aviation” and follow-on “Investigations in Support of Aviation Climate Change Research”. Supported by the FAA.

RESEARCH AIRCRAFT and GROUND-BASED FIELD CAMPAIGNS

ATTREX (Airborne Tropical Tropopause Experiment) Guam, Jan–Feb 2014; NASA Dryden, Oct 2011 and Jan–Feb 2013: Participated in theory team aircraft flight planning

SEAC⁴RS (Studies of Emissions and Atmospheric Composition, Clouds and Climate Coupling by Regional Surveys) Ellington Field, Houston, TX , Aug–Sep 2013: As SEAC⁴RS PI, led water vapor and ozone balloon sonde launches and participated in theory team aircraft flight planning

TC⁴ (Tropical Composition, Clouds and Climate Coupling Mission) and **TICOSONDE TC⁴**, San José, Costa Rica, Jun–Aug 2007: As Ticosonde PI, (a) coordinated 4x-daily radiosonde launches, (b) coordinated vapor and ozone balloon sonde launches for aircraft and satellite validation and (c) organized Costa Rican team providing local weather forecast guidance

TICOSONDE Veranillo, San José, Costa Rica, Jul – Aug 2006: As Ticosonde PI, coordinated (a) 4x-daily radiosonde launches, (b) water vapor and ozone balloon sonde launches

CR-AVE (Costa Rica Aura Validation Experiment) and **TICOSONDE CR-AVE**, San José, Costa Rica, Jan– Mar 2006: As Ticosonde PI, (a) coordinated 4x-daily radiosonde launches, (b) coordinated vapor and ozone balloon sonde launches for aircraft and satellite data validation and (c) organized Costa Rican team providing local weather forecast guidance

TICOSONDE TCSP (Tropical Convective Systems and Processes), San José, Costa Rica, Jun–Aug 2005: As Ticosonde PI, coordinated 4x-daily radiosonde launches and co-led team launching water vapor and ozone balloon sonde launches

TICOSONDE NAME (North American Monsoon Experiment), San José, Costa Rica, Jun–Sep 2004: As Ticosonde PI, coordinated 4x-daily radiosonde launches

Pre-AVE (Aura Validation Experiment) San Jose, Costa Rica, Feb 2004

SOLVE and SOLVE-II (SAGE-III Ozone Loss Validation Experiments) Kiruna, Sweden, Nov-Dec 1999 and Mar 2000; Jan – Feb 2003: Flight planning support and data analysis

CRYSTAL-FACE (SAGE-III Ozone Loss Validation Experiment, 2) Key West, Florida, July-Aug 2002

Prior to 2000:

ACCENT (4/1999 and 9/1999), **SONEX**(Oct 1997), **POLARIS** (May 1997), **VOTE/TOTE** and **STRAT** (1995-1997), **ASHOE-MAESA** (May 1994), **SPADE** (4/1993), **CEPEX** (3/1993), **AASE-II** (2/1992), **STEP-Tropical** (12/1986–2/1987)

NASA GROUP ACHIEVEMENT AWARDS

2008 - Tropical Composition, Cloud and Climate Coupling (TC4)

2007 - Intercontinental Chemical Transport Experiment (INTEX)

2005 – Intercontinental Chemical Transport Experiment North America Science Team

2004 – SAGE III Ozone Loss and Validation Experiment (SOLVE-II) Science Team

2003 – CRYSTAL-FACE Science Team

2002 – Fourth Convection and Moisture Experiment (CAMEX) Science Team

2001 – SAGE III Ozone Loss and Validation Experiment Team

1998 – DC-8 Aircraft SONEX Team

1998 – POLARIS Project Team

1995 – Airborne Southern Hemisphere Ozone Experiment / Measurements for Assessing the Effects of Stratospheric Aircraft Experiment (ASHOE/MAESA) Team

1994 – Stratospheric Photochemistry and Dynamics Expedition (SPADE) Team

EDUCATION

Ph.D., Meteorology, 1986

Massachusetts Institute of Technology, Cambridge, Massachusetts

Thesis: *An Investigation of 40-50 Day Large Scale Divergent Circulations in the Tropical Troposphere* (Advisor, Reginald E. Newell)

Bachelor of Arts, 1977

The Evergreen State College, Olympia, Washington

MANAGEMENT TRAINING

Purchase Requisition Training - Camille Zahno, USRA – April 30, 2018

Topics included: How to Create Simple Purchase Requisitions, How to Create Complex Purchase Requisitions, and How to Approve Purchase Requisitions

Model Manager Training – Tonya Stephens, USRA Director of HR – April 25-26, 2018

Topics included: Engage, Excite and Interest, Performance Planning, How to Give Feedback, Performance Boost and Improvement, Feedback, The First 90 Days

Avoiding Conflicts of Interest – NAVEX Managers Training - Completed February 2017

NASA Grant Proposal Workshop: “Increasing the Probability of Gaining NASA Funding for Your Work”, presented at USRA by Dr. Robert Frey, November 8-9, 2016

Grant Writers’ Workshop: Presented by Drs. David Morrison and Peg Atkinson, May 2, 2016

USRA Leadership Training, December 1–2, 2015

Modules on motivation, recruiting, coaching, communication, performance management and leadership

PUBLICATIONS

Thompson, A. M., J. C. Witte, **H. B. Selkirk**, and others, First reprocessing of Southern Hemisphere Additional Ozonesondes (SHADOZ) ozone profiles (1998–2016): 2. Comparisons with satellites and ground-based instruments. *Journal of Geophysical Research: Atmospheres*, 122, 13 000–13 025. <https://doi.org/10.1002/2017JD027406>, 2017.

Jensen, E., L. Pfister, D. Jordan, T. Bui, R. Ueyama, H. Singh, T. Thornberry, A. Rollins, R. Gao, **H. Selkirk**, and others, The NASA Airborne Tropical Tropopause Experiment – High altitude aircraft measurements in the tropical western Pacific, *Bull. Amer. Meteor. Soc.* 98(1), 29-143, doi: 10.1175/BAMS-D-14-00263.1, 2017.

Huang, G., X. Liu, K. Chance, P. K. Bhartia, Z. Cai, M. Allaart, B. Calpini, G. J. Coetzee, E. Cuevas-Aguiló, **H. B. Selkirk**, and others, Validation of 10-year SAO OMI ozone profile (PROFOZ) product using ozonesonde observations, *Atmos. Meas. Tech.*, 10 (7), 2455-2475, doi: 10.5194/amt-10-2455-2017, 2017.

Hurst, D., W. Read, H. Vömel, **H. Selkirk**, K. Rosenlof, S. Davis, E. Hall, A. Jordan, and S. Oltmans, Recent divergences in stratospheric water vapor measurements by frost point hygrometers and the Aura Microwave Limb Sounder, *Atmos. Meas. Tech.*, 9, 4447-4457, doi:10.5194/amt-9-4447-2016, 2016.

Brasseur, G., M. Gupta, B. Anderson, S. Balassubramanian, S. Barrett, D. Duda, G. Fleming, P. Forster, J. Fuglestvedt, **H. Selkirk**, and others, Impact of aviation on climate – FAA’s Aviation Climate Change Research Initiative (ACCRI) Phase II, *Bull. Amer. Meteor. Soc.*, 97(4), 561-583. doi: 10.1175/BAMS-D-13-00089.1, 2016.

Schoeberl, M. R., **H. B. Selkirk**, H. Vömel, and A. R. Douglass, Sources of seasonal variability in tropical upper troposphere and lower stratosphere water vapor and ozone: Inferences from the Ticosonde data set at Costa Rica, *J. Geophys. Res. Atmos.*, 120, 9684–9701, doi:10.1002/2015JD023299, 2015.

Pan, L. L., L. C. Paulik, S. B. Honomichl, L. A. Munchak, J. Bian, **H. B. Selkirk**, and H. Vömel, Identification of the tropical tropopause transition layer using the ozone-water vapor relationship, *J. Geophys. Res. Atmos.*, 119, 3586–3599, doi:10.1002/2013JD020558, 2014.

Olsen, S. C, G. P. Brasseur, D. J. Wuebbles, S. R. Barrett, H. Dan, S. D. Eastham, M. Z. Jacobson, A. Khodayari, **H. B. Selkirk**, A. Sokolov, and N. Unger, Comparison of model estimates of the effects of aviation emissions on atmospheric ozone and methane, *Geophys. Res. Lett.*, 40, 6004–6009, doi: 10.1002/2013GL0567660, 2013.

Thompson, A. M, S. K. Miller, S. Tilmes, D. W. Kollonige, J. C. Witte, S. J. Oltmans, B. J. Johnson, M. Fujiwara, F. J. Schmidlin, **H. B. Selkirk**, and others, Southern Hemisphere Additional Ozonesondes (SHADOZ) ozone climatology (2005-2009): Tropospheric and tropical tropopause layer (TTL) profiles with comparisons to OMI-based ozone products, *J. Geophys. Res.*, 117, doi: 10.1029/2011JD016911, 2012.

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- Selkirk, H. B.**, H. Vömel, J. M. Valverde Canossa, L. Pfister, J. A. Diaz, W. Fernández, J. Amador, W. Stolz, and G. S. Peng, Detailed structure of the tropical upper troposphere and lower stratosphere as revealed by balloon sonde observations of water vapor, ozone, temperature, and winds during the NASA TCSP and TC4 campaigns, *J. Geophys. Res.*, 115, D00J19, doi:10.1029/2009JD013209, 2010.
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- Jensen, E. J., O. B. Toon, L. Pfister, and **H. B. Selkirk**, Dehydration of the upper troposphere and lower stratosphere by subvisible cirrus clouds near the tropical tropopause, *Geophys. Res. Letts.*, 23, 825-828, 1996.
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- Selkirk, H. B.**, The tropopause cold trap in the Australian monsoon during STEP/AMEX 1987. *J. Geophys. Res.*, 98, 8591-8610, 1993.
- Russell, P. B., L. Pfister and **H. B. Selkirk**, The tropical experiment of the Stratosphere-Troposphere Exchange (STEP): Science objectives, operations, and summary findings, *J. Geophys. Res.*, 98, 8563-9589, 1993.
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- Selkirk, H. B.**, An investigation of 40-50 day large scale divergent circulations in the tropical troposphere, Ph. D. thesis, Massachusetts Institute of Technology, Cambridge, Massachusetts, 281 pp., 1986.
- Selkirk, R.**, Seasonally stratified correlations of the 200 mb tropical wind field to the Southern Oscillation, *J. Climatology*, 4, 365-382, 1984.